

## AMENDMENTS IN THE CLAIMS

Claims 58 and 82 are canceled (claims 1-7 and 9-56 were canceled in a previous paper), claims 8, 67, 78, 84 and 85 are amended, and new claim 94 is added. No new matter is believed to be introduced by the aforementioned amendments and new claim.

### 1. - 7. (Cancelled)

8. (Amended) In an x-ray tube comprising a vacuum enclosure having disposed therein a target anode with a target surface, an integral cathode disposed in the vacuum enclosure and being spaced apart from the target surface of the target anode, the integral cathode comprising:

- (a) an emitter ~~capable of~~ configured to discharging electrons receive a flow of electrical current such that thermionic emission of electrons from the emitter is facilitated, said emitter having a predetermined geometrical configuration oriented to cause at least some of the ~~discharged~~ emitted electrons to be directed at the target surface of the target anode and converge at a focal spot, wherein said predetermined geometrical configuration provides an emitter having a cross-section substantially in the shape of an arc so that a concave side of said emitter is directed towards the target surface of the anode, and the emitter defining a cutout; and
- (b) a support cartridge, said support cartridge providing structural support for said emitter.

### 9. - 56. (Cancelled)

57. **(Previously submitted)** The integral cathode as recited in claim 8, wherein the emitter is substantially confined within the support cartridge.

58. **(Canceled)**

59. **(Previously submitted)** The integral cathode as recited in claim 8, wherein the arc shape of the emitter comprises one of: a substantially parabolic arc; and, a substantially circular arc.

60. **(Previously submitted)** The integral cathode as recited in claim 8, wherein the emitter substantially comprises a single piece of material.

61. **(Previously submitted)** The integral cathode as recited in claim 8, wherein the emitter substantially comprises a refractory metal.

62. **(Previously submitted)** The integral cathode as recited in claim 8, wherein the emitter is doped with a dopant.

63. **(Previously submitted)** The integral cathode as recited in claim 8, wherein the emitter comprises a plurality of subsidiary emitting portions.

64. **(Previously submitted)** The integral cathode as recited in claim 8, wherein the support cartridge serves to substantially maintain the emitter in the arc shape.

65. **(Previously submitted)** The integral cathode as recited in claim 8, wherein the support cartridge substantially comprises one of: a ceramic material; and, cataphoretically coated iron.

66. **(Previously submitted)** The integral cathode as recited in claim 8, wherein the support cartridge comprises:

an electrically conductive portion; and  
a non-electrically conductive portion.

67. **(Amended)** An integral cathode, comprising:

an emitter substantially comprising an emissive surface having a shape configured to direct a majority of electrons emitted from spatially diverse locations on the emissive surface to a common focal point, the emitter being configured to receive a flow of electrical current such that thermionic emission of electrons from the emitter is facilitated; and

a support cartridge within which the emitter is at least partially received.

68. **(Previously submitted)** The integral cathode as recited in claim 67, wherein the emissive surface substantially comprises a single piece of material.

69. **(Previously submitted)** The integral cathode as recited in claim 67, wherein the emitter is substantially confined within the support cartridge.

70. **(Previously submitted)** The integral cathode as recited in claim 67, wherein the emitter defines at least one cutout.

71. **(Previously submitted)** The integral cathode as recited in claim 67, wherein the emissive surface is substantially concave in shape.

72. **(Previously submitted)** The integral cathode as recited in claim 71, wherein the substantially concave shape comprises one of: a substantially parabolic arc; and, a substantially circular arc.

73. **(Previously submitted)** The integral cathode as recited in claim 67, wherein the emitter substantially comprises a refractory metal.

74. **(Previously submitted)** The integral cathode as recited in claim 67, wherein the emitter is doped with a dopant.

75. **(Previously submitted)** The integral cathode as recited in claim 67, wherein the support cartridge serves to substantially maintain the emitter in the shape.

76. **(Previously submitted)** The integral cathode as recited in claim 67, wherein the support cartridge substantially comprises one of: a ceramic material; and, cataphoretically coated iron.

77. **(Previously submitted)** The integral cathode as recited in claim 67, wherein the support cartridge comprises at least one of:

an electrically conductive portion; and

a non-electrically conductive portion.

78. **(Amended)** An integral cathode, comprising:

an emitter substantially comprising a substantially concave emissive surface configured to be oriented toward a target surface of a target anode, and the emitter defining a cutout; and

a support cartridge within which the emitter is at least partially received.

79. **(Previously presented)** The integral cathode as recited in claim 78, wherein the substantially concave shape comprises one of: a substantially parabolic arc; and, a substantially circular arc.

80. **(Previously presented)** The integral cathode as recited in claim 78, wherein the emissive surface substantially comprises a single piece of material.

81. **(Previously presented)** The integral cathode as recited in claim 78, wherein the emitter substantially comprises a refractory metal.

82. **(Canceled)**

83. **(Previously presented)** The integral cathode as recited in claim 78, wherein the support cartridge comprises:

an electrically conductive portion; and

a non-electrically conductive portion.

84. **(Amended)** An x-ray device, comprising:

a vacuum enclosure;

~~within which~~ a target anode having a target surface ~~[[is]]~~ and being substantially disposed within the vacuum enclosure such that the target anode and target surface are spaced apart from the vacuum enclosure; and

an integral cathode substantially disposed within the vacuum enclosure and comprising:

an emitter substantially comprising an emissive surface having a shape configured to direct a majority of electrons emitted from spatially diverse locations on the emissive surface to a common focal point proximate the target surface; and

a support cartridge within which the emitter is at least partially received.

85. **(Amended)** The x-ray device as recited in claim 84, wherein the ~~target anode comprises a rotating type target anode~~ emitter is configured to receive a flow of electrical current such that thermionic emission of electrons from the emitter is facilitated.

86. **(Previously presented)** The x-ray device as recited in claim 84, wherein the emissive surface of the emitter substantially comprises a single piece of material.

87. **(Previously presented)** The x-ray device as recited in claim 84, wherein the emitter defines at least one cutout.

88. **(Previously presented)** The x-ray device as recited in claim 84, wherein the emissive surface is substantially concave in shape.

89. **(Previously presented)** The x-ray device as recited in claim 88, wherein the substantially concave shape comprises one of: a substantially parabolic arc; and, a substantially circular arc.

90. **(Previously presented)** The x-ray device as recited in claim 84, wherein the emitter substantially comprises a refractory metal.

91. **(Previously presented)** The x-ray device as recited in claim 84, wherein the emitter is doped with a dopant.

92. **(Previously presented)** The x-ray device as recited in claim 84, wherein the support cartridge substantially comprises one of: a ceramic material; and, cataphoretically coated iron.

93. **(Previously presented)** The x-ray device as recited in claim 84, wherein the support cartridge comprises at least one of:

an electrically conductive portion; and

a non-electrically conductive portion.

94. **(New)** The x-ray device as recited in claim 84, wherein the support cartridge facilitates maintenance of the emitter in a predetermined shape.